

MS49N02

N-Channel 40V MOSFETs

Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- 40V, 160A, $R_{DS(ON)} = 2.5m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- RoHS compliant package

Applications

- PowerTools
- Load Switch
- LED applications
- Motor Drive Applications

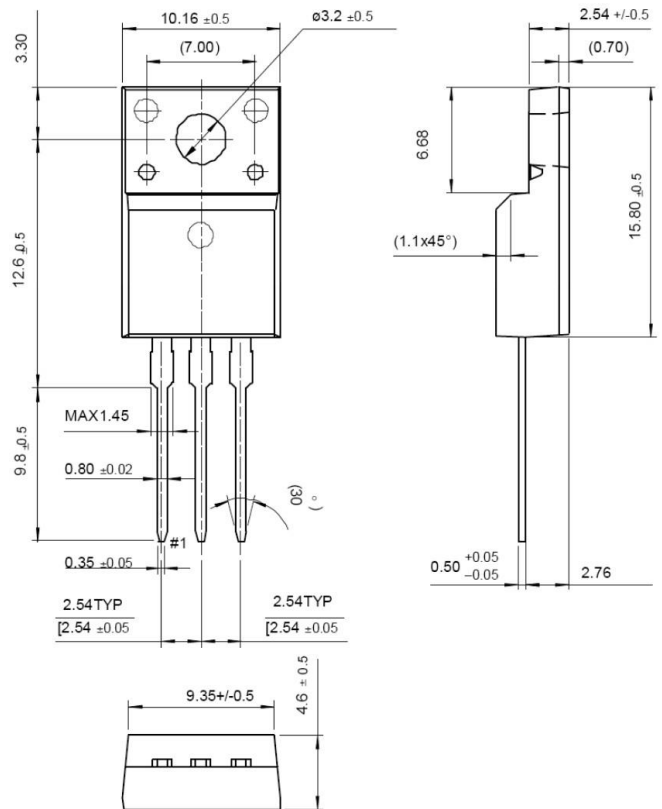
Package type : TO-220

Packing & Order Information

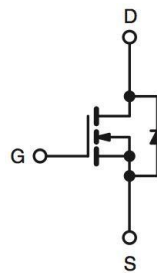
3.000/Box



RoHS
COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)			
Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$) (Chip Limitation)	160	A
	Drain Current - Continuous ($T_C=100^\circ C$) (Chip Limitation)	88	A
I_{DM}	Drain Current - Pulsed ¹	560	A
EAS	Single Pulse Avalanche Energy ²	360	mJ

MS49N02

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Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
I _{AS}	Single Pulse Avalanched Current ²	85	A
P _D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	142	W
	Power Dissipation - Derate above 25°C	1.14	W/°C
T _J	Operating Junction Temperature Range	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Thermal Resistance Junction to ambient	--	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	--	0.88	

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = V_{GS}, I_D = 250\mu\text{A}$	40			V
I _{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			±100	nA
I _{DSS}	Drain-Source Leakage Current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^{\circ}\text{C}$			1	uA
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^{\circ}\text{C}$			10	

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
R _{DS(on)}	Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		2.1	2.5	mΩ
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		2.5	3.5	
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_S = 10\text{ A}$		45		S

Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q _g	Total Gate Charge ^{3,4}	$V_{DS} = 20\text{ V}, I_D = 10\text{ A},$ $V_{GS} = 4.5\text{ V}$	--	70	140	nC
Q _{gs}	Gate-Source Charge ^{3,4}		--	15	32	nC
Q _{gd}	Gate-Drain Charge ^{3,4}		--	40	80	nC
C _{ISS}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}, V_{GS} = 0\text{ V}$	--	8000	12000	pF
C _{OSS}	Output Capacitance		--	550	1000	pF
C _{RSS}	Reverse Transfer Capacitance		--	420	800	pF
R _g	Total Gate Charge		$V_{DS} = 0\text{ V}, f = 1\text{ MHz}, V_{GS} = 0\text{ V}$	--	1.2	2.4

MS49N02

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Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time ^{3,4}	$I_D = 10\text{ A}$, $R_G = 10\ \Omega$, $V_{GS} = 10\text{ V}$, $V_{DD} = 20\text{ V}$	--	24.6	48	ns
t_r	Rise Time ^{3,4}		--	62.8	120	ns
$t_{d(off)}$	Turn-Off Delay Time ^{3,4}		--	224	440	ns
t_f	Fall Time ^{3,4}		--	162	320	ns

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source Current	$V_G = V_D = 0\text{ V}$, Force Current	--	--	140	A
I_{SM}	Pulsed Source Current		--	--	280	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 1\text{ A}$, $T_J = 25^\circ\text{C}$	--	--	1	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $I_S = 1\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$	--	32	--	ns
Q_{rr}	Reverse Recovery Charge		--	19	--	nC

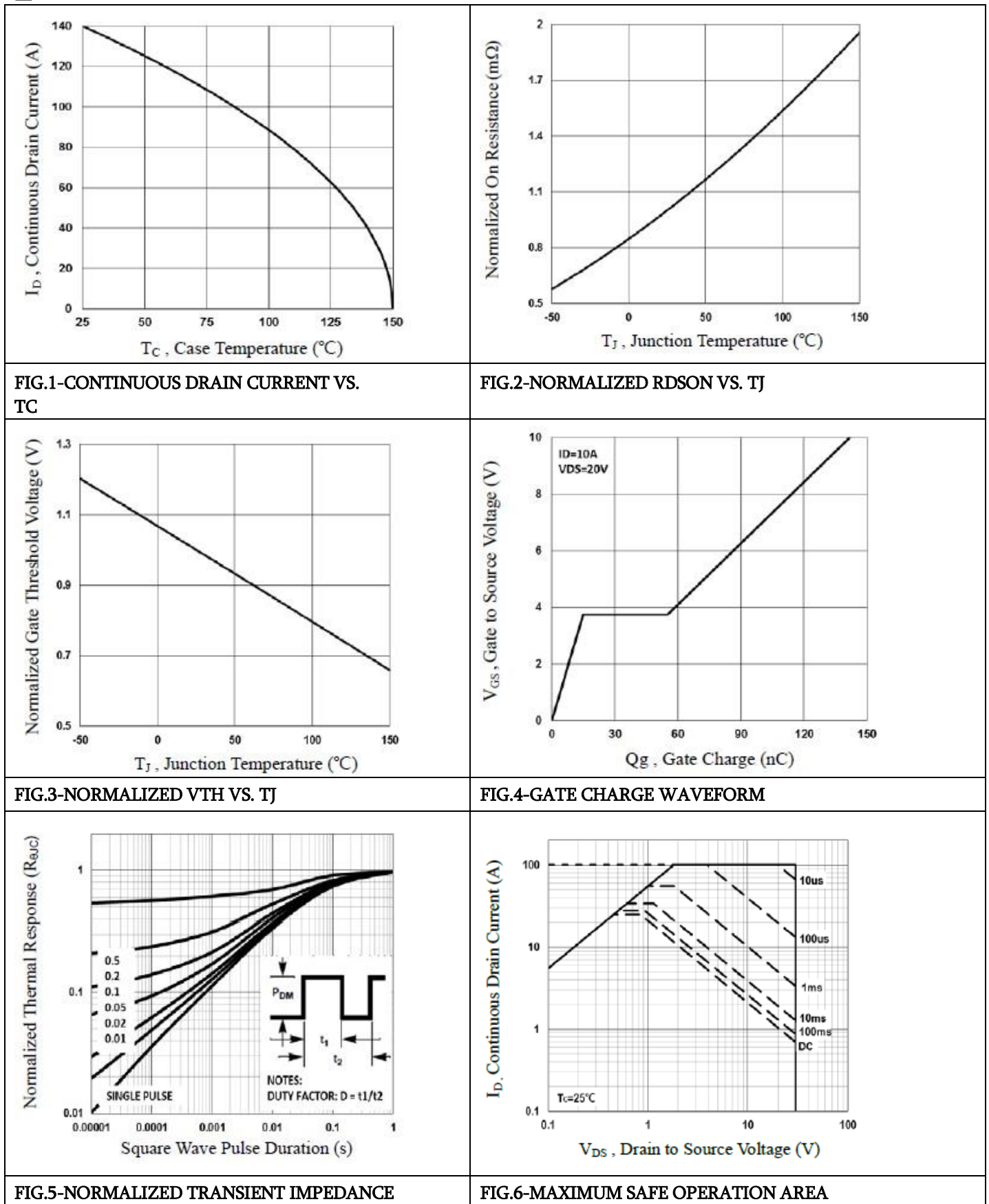
Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD} = 25\text{ V}$, $V_{GS} = 10\text{ V}$, $L = 1\text{ mH}$, $I_{AS} = 8\text{ A}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$.
- 3.The data tested by pulsed , pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- 4.Essentially independent of operating temperature.

MS49N02

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■ Characteristics Curve



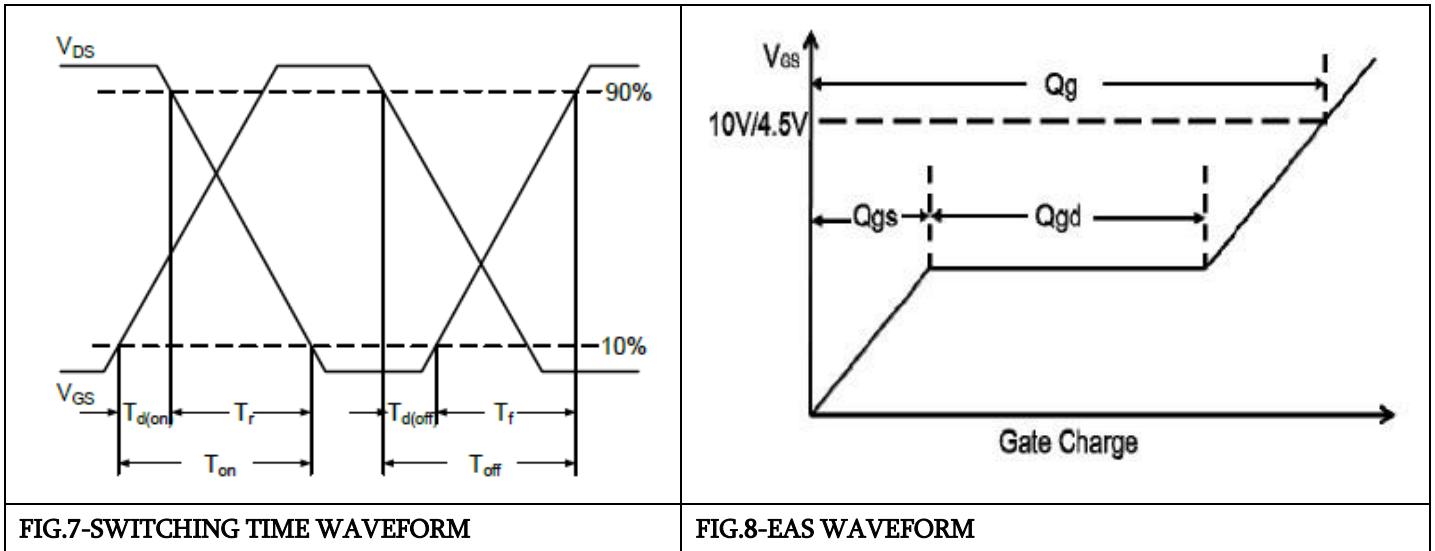
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■ Characteristics Curve



MS49N02

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